A tripod for supporting apparatus in general and, in particular, for optical or photographic apparatus and the like

Technical field

The present invention relates to a tripod for supporting apparatus in general and, in particular, for optical or photographic apparatus and the like, according to the preamble to main Claim 1.

In this context, the term "tripod" is used in its widest sense to mean a support with three or more legs converging in a spider for the positioning and mounting of a head with which the desired apparatus can in turn be associated.

Technological background

Within the specific technical field, it is desirable to provide tripods which can satisfy the conflicting requirements of minimized size when closed up and of maximized positioning height when the tripod is opened out. A constructional limitation typical of known tripods results from the fact that each leg of the tripod is articulated to the spider by means of a pin extending through the first leg section; this obstructs the further sections which are fitted telescopically in the first, affecting their useful length and limiting their extension.

A first known tripod solution which pursues this aim is described in European patent application EP 1122486. In order to maximize the positioning height of the opened-out tripod, this solution maximizes the length of each leg section of the tripod by using an articulation of the legs to the spider which is achieved by opposed appendages projecting radially from a cap fitted on the top of the leg section articulated to the spider. This solution affords the advantage of making the best use of the telescopic lengthening of the legs, permitting optimal utilization of the space inside the telescopic extensions.

However, even with this solution, the tripod is still quite bulky in the closed-up condition.

Description of the invention

The problem underlying the present invention is that of providing a tripod for supporting apparatus in general and, in particular, for optical or photographic apparatus and the like, which is designed structurally and functionally to overcome the limitations set out above with reference to the prior art cited.

This problem is solved by the present invention by means of a tripod for supporting apparatus in general, formed in accordance with the appended claims.

Brief description of the drawings

The characteristics and the advantages of the invention will become clearer from the detailed description of a preferred embodiment thereof, illustrated by way of non-limiting example, with reference to the appended drawings, in which:

- Figure 1 is a perspective view of a tripod formed in accordance with the present invention, in a first operative condition in which it is opened out to the maximum extent,

- Figure 2 is a perspective view of the tripod of Figure 1 in a second, closed-up, most compact operative condition,

- Figure 3 is a sectioned side elevational view of a detail of the tripod of Figure 2,

- Figure 4 is a view of a second detail of the tripod of Figure 2, from above and in section, and

- Figure 5 is a sectioned side elevational view of a third detail of the tripod of Figure 2.

Preferred embodiment of the invention

In Figures 1 and 2, a tripod for supporting apparatus in general and, in particular, for optical or photographic apparatus and the like, formed in accordance with the invention, is generally indicated 1.

The term "tripod" is intended to define below supports for apparatus, preferably cinematographic or photographic apparatus, without limitation of the number of legs.

The tripod 1 includes a spider 2 with a principal axis X, and comprising three lobes 2a, 2b, 2c in which three respective legs, all indicated 3, converge and are articulated in the manner described below. Each leg 3 is formed with a telescopic structure of known type, with four sections 3a, 3b, 3c, 3d, the relative positioning of which is adjustable by means of clamps, all indicated 5. A sleeve 40 is fitted and fixed like a cap on each first section 3a and bears a radial appendage 34 which can be housed so as to be rotatable but restrained axially in a respective seat 36 formed in the corresponding lobe 2a, 2b or 2c. For the axial restraint of the appendage 34 in the seat 36, both have a double conical shape defining a channel 41 and an annular cusp 42, respectively, in a mutually coupled condition.

In a central region of the spider 2 there is a through-hole 6 which has a cylindrical surface extending coaxially with the axis X, and in which a stem 7 of a cylindrical, tubular pillar 8 with axially opposed ends indicated 7a and 7b, is housed slidably.

The sliding of the pillar 8 in the through-hole 6 can be locked in an adjustable position by means of a brake 9, preferably of the type with a cam 11 and a pad 12, operated by means of an operating lever 10.

The tripod 1 comprises a head 4 with a ball joint and means for fixing it to the end 7a of the stem 7. The fixing means comprise a collet 19 with four jaws 20 housed inside a sleeve 21 with a frusto-conical opening 22, driven into the end 7a of the stem 7.

The head 4 comprises a spherical element 15 from which a rod 16 extends, the rod 16 carrying a ring nut 17 on which the preselected apparatus (not shown) is releasably restrained, for example, by means of a threaded appendage 18. The spherical element 15 is housed in the collet 19 and, according to the degree of tightening of the elements 20, can or cannot rotate in order to achieve the desired orientation of the apparatus.

A tie rod 23 has an end 23a in abutment with a base 24 of the collet 19.

In order to adjust the orientation of the head 4, means for adjusting the tension of the tie rod 23 are provided and include a knob 27 which is engaged by the screwing of a female thread 30 thereof onto a threaded end 23b of the tie rod. A guide bush 25 is driven into the end 7b of the stem 7, partially projecting therefrom to define an abutment surface 26 for the knob 27.

An axial hole 13 formed in the guide bush 25 has channels 28 which are engaged by flat portions 29a, 29b of the tie rod 23, which is consequently guided in the hole 13 in a non-rotatable manner.

The tensioning of the tie rod 23 caused by the screwing of the knob 27 exerts on the collet 19 a pull which, because of the frustoconical shape of the opening 22, clamps the jaws 20 of the collet 19 onto the spherical element 15 so that the head 4 is thus locked in the preselected orientation. If the knob 27 is slackened, the head 4 is freely orientable.

In order for the tie rod 23 to be tensioned slightly, even when the knob 27 is fully slackened (or even removed to permit removal of the stem from the spider), means for preloading the collet system are provided and comprise a spring 31 interposed between a ring 32 fixed to the tie rod 23 and a shoulder 33 formed in the bush 25.

When the tripod 1 is in the operative, "opened-out" position, it can adopt a configuration of maximum extent in which the legs 3 are in the most extended position and the pillar 8 is slid out of the hole 6 in the spider 2 to the maximum extent.

The extension and positioning of the legs 3 in the opened-out position are performed conventionally by operating the clamps 5 and pivoting the legs about the appendages 34.

The preselected apparatus is mounted on the threaded appendage 18 and is oriented by slackening of the knob 27, and consequently of the tie rod 23, so that the collet 19 loosens its grip on the spherical element 15 so that it can adopt different orientations. Even if the knob is accidentally slackened too much, the tie rod 23 nevertheless maintains a minimum tensioning condition by virtue of the spring 31, so that sudden and uncontrolled oscillations of the head and possible damage to the apparatus fixed thereto are prevented.

When the desired position has been reached, the knob 27 is tightened to lock the ball joint in the position reached and the height of the pillar 8 is then adjusted by means of the operating lever 10, whilst the preselected orientation of the ring nut 17 is maintained.

In order to close up the tripod, once the apparatus has been removed from the head 4 and the legs have been closed up by telescopic retraction of the sections into one another, the knob 27 is slackened, leaving the head 4 free to oscillate. By operation of the operating lever 10, the pillar 8 is translated to a position of minimum extent in which the end 7a of the stem 7 of the pillar 8 is housed in the hole 6. At the end of its travel, part of the head 4, in particular, the spherical element 15 and the rod 16, are also housed inside the hole 6. The ring nut 17 is brought into abutment with the spider 2, with the function of a stop for preventing loss of the pillar 8, which is restrained by the spider, between the ring nut 17 and the knob 27.

The invention thus solves the problem posed, affording many advantages over the prior art mentioned.

A first advantage is that the tripod is extremely compact in the closed-up condition, by virtue of the fact that the head, which usually projects from the spider, can be introduced into the hole in the spider.

The fact that the head can be housed in the spider also simplifies the construction of the pillar since an attachment for the head, which also projects from the spider in conventional tripods, is no longer provided.

In addition, even though the tripod has extremely compact dimensions when closed up, its vertical extent when opened out is not compromised, since there is no limitation to the extension of the legs or of the pillar.

Moreover, even though the head is housed in the hole in the spider, it can nevertheless be operated easily since the controls for the orientation and

adjustment of the head are located at the opposite end of the pillar, and are thus easily accessible.